Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

High quality exchange rotations in spin qubits using symmetric gating[1] F. MARTINS, F. K. MALINOWSKI, P. D. NISSEN, C. M. MARCUS, F. KUEMMETH, Center for quantum devices, Niels Bohr Institute, University of Copenhagen, Denmark, E. BARNES, Department of Physics, Virginia Tech / Condensed Matter Theory Center and Joint Quantum Institute, Department of Physics, University of Maryland, USA, G. C. GARDNER, S. FALLAHI , M. J. MANFRA, Department of Physics and Astronomy and Birck Nanotechnology Center, Purdue University, USA — We present results on a singlet-triplet qubit implemented in a GaAs/AlGaAs heterostructure and we show that exchange oscillations can be realized either by tilting the double well potential, the conventional method, or by symmetrically lowering the barrier, as originally suggested by Loss and DiVincenzo. The two methods are compared here. We find that lowering the barrier between dots has much less relative exchange noise compared to tilting the potential. Since exchange rotations are sensitive to electrical noise and relatively insensitive to nuclear noise, this yields significantly enhanced free induction decay times and quality factors. Our results are comparable to those reported recently in silicon quantum dot devices, obtained using similar techniques.

[1]Support through IARPA-MQCO, LPS-MPO-CMTC, Army Research Office, and the Danish National Research Foundation is acknowledged

Frederico Martins
QDev, Niels Bohr Institute, University of Copenhagen, Denmark

Date submitted: 06 Nov 2015 Electronic form version 1.4